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ABSTRACT

In order to evaluate Virginia Western Community College's (VWCC) nursing program and the proficiencies of its graduates, an examination was made of the interrelatedness of certain student characteristics/achievements and subtest scores. Statistical analyses of the data included: (1) a demographic profile of graduates, (2) descriptive analyses of examination scores, (3) correlation of scores and characteristics, and (4) canonical correlation analyses between student characteristics/achievement variables and state board scores. Results of the study indicated that: (1) approximately 95 percent of the graduates were either single females (40.9 percent) or married females (54.5 percent); (2) approximately 73 percent of the students were 25 years or older; (3) VWCC GPA's correlated significantly with all subtest scores; (4) high school rank, high school Algebra 1, and age correlated significantly only with certain subtest scores; (5) no significant correlations were found between high school chemistry grades and subtest scores; and (6) 81 percent of the variance between subtest scores and student characteristics/achievement variables can be explained by canonical variable 1. These results supported the present screening and selection procedures with the recommendation that the use of high school chemistry grades as a criterion for admission be reviewed. (Author/DB)

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# A STUDY OF THE INTERRELATEDNESS OF NURSING BOARD EXAMINATION SCORES AND STUDENT CHARACTERISTICS/ACHIEVEMENT VARIABLES AT VIRGINIA WESTERN COMMUNITY COLLEGE

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## INTRODUCTION

In July 1974 twenty-two (22) graduates of Virginia Western Community College (VWCC) Nursing Program took the State Board Test Pool Examination. All graduates passed the examination with a large majority of the graduates scoring considerably higher than the 350 score required to pass each of the subtests of the examination. In order to evaluate VWCC's Nursing Program and the proficiencies of its graduates, comparative data were requested from state and national associations responsible for the examination. Although VWCC's requests for norming data were denied, both state and national associations indicated that these scores were exceptionally high. Dr. Harold H. Hopper, President of VWCC, proposed that characteristics and previous academic records of these successful nursing students be examined in an attempt to explain and/or interrelate students' characteristics and examination scores. Results of the study could possibly provide selection models for choosing future nursing applicants both at VWCC and other similar institutions.

## PURPOSE AND DESIGN OF THE STUDY

The purpose of the study was to examine and display the interrelatedness of certain student characteristics/achievements and their scores on the state board examination. The design of the study required the collection of student characteristic variables that had previously been identified as characteristics most important in the screening and selection procedures of the nursing applicants. These characteristics

included high school rank and high school grades in Algebra I and Chemistry. Other characteristics added to the study included age and marital status. Statistical analyses of the data included (1) a demographic profile of graduates, (2) descriptive analyses of examination scores, (3) correlations of scores and characteristics, and (4) canonical correlation analyses between student characteristics and state board scores.

## RESULTS

### Demographic Profile

A study of the demographic characteristics of the graduates identified age, sex, and marital status. Table 1 indicates the sex and marital status of the graduates.

TABLE 1

SEX AND MARITAL STATUS

| | Single | | Married | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Male | 0 | 0.0 | 1 | 4.6 | 1 | 4.6 |
| Female | 9 | 40.9 | 12 | 54.5 | 21 | 95.4 |
| Total | 9 | 40.9 | 13 | 59.1 | 22 | 100.0 |

The table indicated that approximately 95% of the graduates were either single females (40.9%) or married females (54.5%).

Table 2 indicates the age ranges of the graduates.

TABLE 2

AGE RANGES OF GRADUATES

| | N | % |
|---|---|---|
| Above 40 | 5 | 22.7 |
| 31 to 40 | 4 | 18.2 |
| 25 to 30 | 7 | 31.8 |
| 18 to 24 | 6 | 27.3 |

The table indicated that approximately 73% of the graduates were 25 years or older. This data supported the fact that VWCC is attracting students older than the traditional 18-24 college age group.

Descriptive Analyses of Examination Scores

Table 3 indicates the means, standard deviations, and ranges of the five subsets: Medical Nursing (MED NSG), Surgical Nursing (SURG NSG), Obstetrical Nursing (OBS NSG), Nursing of Children (NSG CHL), and Psychiatric Nursing (PSY NSG).

TABLE 3

MEANS, STANDARD DEVIATIONS, AND RANGES

| | MED NSG | SURG NSG | OBS NSG | NSG CHL | PSY NSG |
|---|---|---|---|---|---|
| Mean | 548.85 | 572.32 | 578.64 | 572.18 | 598.95 |
| Standard Deviations | 95.83 | 80.45 | 79.54 | 87.35 | 75.77 |
| Ranges | 405-734 | 372-687 | 396-691 | 388-779 | 450-741 |

The table indicated that the means for all subtests were substantially above the 350 score required to pass each of the subtests. Since norming data was unavailable, extreme caution was recommended in comparing subtest scores.

Correlation Coefficients of Examination Scores and Characteristics

Table 4 presents correlation coefficients between examination scores and selected characteristic variables.

TABLE 4

CORRELATION COEFFICIENTS AND SIGNIFICANT LEVELS

| Student Characteristics | Medical Nursing | Surgical Nursing | Obstetrical Nursing | Nursing of Children | Psychiatric Nursing |
|---|---|---|---|---|---|
| High School Rank | .1805 | .2655 | .3771*** | .5416* | .2304 |
| High School Chemistry Grade | .0469 | -.0290 | .0213 | .1839 | .1970 |
| High School Algebra I Grade | .0943 | .2653 | .4054*** | .4032*** | .2718 |
| Age | .5975* | .4799** | .2504 | .3521 | .1101 |
| VWCC Grade Point Average | .6925* | .6327* | .7258* | .7847* | .5758* |

*Significant at .01 level
**Significant at .05 level
***Significant at .10 level

The data indicated that high school rank was significantly correlated with Obstetrical Nursing (.3771) and Nursing of Children (.5416) scores. No significant correlations were found between high school chemistry grades and Nursing test scores; whereas, high school algebra I grades also had significant correlations between Obstetrical Nursing (.4054) and Nursing of Children

(.4032) scores. Age correlated significantly with Medical Nursing (.5975) and Surgical Nursing (.4799) scores. All Nursing Board Examination Scores correlated significantly with VWCC grade point averages (GPA).

Canonical Correlation Analyses

The previous section identified bivariate correlations between selected examination scores and student characteristics. To think about these 25 correlations simultaneously was found to be a difficult task especially if the extent and the nature of the interrelationships of examination scores and student characteristics were the major concerns. Therefore, canonical correlations were computed in order to present indices of the relationships between examination scores and student characteristics/achievement variables. These correlations systematically extracted the sources of variance between the two sets of variables.

Table 5 presents five canonical correlations, squares of canonical correlations, and Bartlett's chi-square statistic for testing the significance of the correlations.

TABLE 5

CANONICAL CORRELATION STATISTICS

| Canonical Variable | Canonical Correlation | Square of Canonical Correlation | Chi-Square |
|---|---|---|---|
| 1 | .9016* | .8129 | 44.41 |
| 2 | .6207 | .3853 | 16.75 |
| 3 | .4860 | .2362 | 8.73 |
| 4 | .4686 | .2196 | 4.27 |
| 5 | .1064 | .0113 | 0.18 |

*Significant at .01 level

The data indicated that canonical variable 1 was significant at the .01 alpha level. Canonical variables 2, 3, 4, and 5 were not significant as tested by Bartlett's chi-square statistics. The square of the canonical correlation 1 estimated that approximately 81% of variance was shared by the two composites.

Table 6 presents a second computer run of the CANCORR PROC that omitted VWCC GPA. Canonical correlations, squares of canonical correlations, and chi-square statistics are indicated.

TABLE 6

CANONICAL CORRELATION STATISTICS

| Canonical Variables | Canonical Correlations | Square of Canonical Correlations | Chi-Square |
|---|---|---|---|
| 1 | .8308* | .6902 | 30.719 |
| 2 | .5381 | .2896 | 10.792 |
| 3 | .4694 | .2203 | 4.981 |
| 4 | .2077 | .0431 | 0.750 |

*Significant at .07 level

Canonical variable 1 was significant at a .07 alpha level. The square of canonical variable 1 indicated that approximately 69% of the variance was shared by the two composites. A comparison of the two computer runs indicated that an additional 12% of the variance shared by the two composites can be "explained" by adding VWCC GPA's.

## DISCUSSION

An examination of the demographic characteristics of nursing graduates indicated that approximately 95% of the students were either

single females (40.9%) or married females (54.5%). Approximately 73% of the students were 25 years or older. Descriptive analyses of Nursing Examination Board scores indicated means significantly above the 350 score required to pass each subtest of the examination. An examination of the ranges of each subtest indicated scores above 700 for three of the five subtests. Although norming scores from national nursing associations were unavailable, indications were that 700 scores were rarely obtained. The fact that four subtest scores were above 700 was one indicator of the effectiveness of the program. Other indicators were the high mean averages for all subtests.

Significant correlations between all subtest scores and VWCC GPA's were computed; whereas, high school rank, high school Algebra I grades, and age correlated significantly only with certain subtest scores. No significant correlations were found between high school chemistry grades and board subtest scores.

The canonical correlation analyses attempted to display the interrelatedness between subtest scores and student characteristic/achievement variables. The fact that 81% of the variance shared by the two composites were computed indicated the interrelatedness of the two composite sets. A comparison of two canonical correlation analyses indicated that an additional 12% of the variance shared by the two sets of variables can be "explained" by adding VWCC GPA's.

## CONCLUSIONS

The results of the study supported the interrelatedness of age, high school rank, and high school Algebra I grades with selected nursing

subtest scores. The fact that high school chemistry grades and subtest scores d'd not correlate significantly indicated a need to re-evaluate its appropriateness in the screening and selection processes of future nursing applicants. The fact that age correlated positively with all subtest scores lended support that older students can perform equally and possibly better than students from the 18-24 college age group.

In summary, the study supported the present screening and selection procedures with the recommendation that further review and research be directed toward the appropriateness of using high school chemistry grades as a selection criterion.

## REFERENCE

Barr, Anthony James and James Howard Goodnight. A User's Guide to the Statistical Analysis System. Raleigh, North Carolina: Sparks Press, 1972.

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